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Notice of Allowability

Application No.

10/672,224

Examiner

Curtis B. Odom

Applicant(s)

PETZOLD ET AL.

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amdt filed on 2/8/2007.
2. ☒ The allowed claim(s) is/are 1,2,4-11,13-15 and 17-20.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Brain Bollinger on February 15, 2007.

The application has been amended as follows:

Claim 1. A method of detecting at least one characteristic of a signal of interest within an input signal, comprising:

 multiplying at least one set of samples from the input signal by at least one set of samples representing a complex conjugate of the input signal to obtain a series of correlation samples;

 summing sets of one or more consecutive correlation samples to obtain a series of pulse sums, each pulse sum having an associated start time;

 integrating a plurality of sets of non-consecutive pulse sums, with the start times of each successive non-consecutive pulse sum in a given set being separated from a preceding pulse sum in the set by an pulse repeat value associated with the set, to obtain respective search values for the plurality of sets of non-consecutive pulse sums;

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selecting an optimal search value as representing a pulse repeat interval for the signal of interest equal to the pulse repeat value separating pulse sums associated with the set of non-consecutive pulse sums represented by the optimal search value; and

detecting the signal of interest within the input signal according to the determined pulse repeat interval.

Claim 9. A cross-correlation detection system that detects at least one characteristic of a signal of interest comprising:

a digital multiplier that multiplies at least one set of samples from the input signal by at least one set of samples representing a complex conjugate of the input signal to obtain a series of correlation samples;

at least one digital integrator that sums sets of one or more consecutive correlation samples to obtain a series of pulse sums, each pulse sum having an associated start time; and

a digital signal processor that integrates a plurality of sets of non-consecutive pulse sums, with the start times of each successive non-consecutive pulse sum in a given set being separated from a preceding pulse sum in the set by a pulse repeat value associated with the set, to obtain respective search values for the plurality of sets of non-consecutive pulse sums and selects an optimal search value as representing a pulse repeat interval for the signal of interest equal to the pulse repeat value associated with the set of non-consecutive pulse sums represented by the optimal search value.

Claim 13. A computer readable medium encoded with a computer program that is operative in a data processing system, that detects at least one characteristic of a signal of interest within an input signal, the program comprising:

a digital multiplication function that multiplies at least one set of samples from the input signal by at least one set of samples representing a complex conjugate of the input signal to obtain a series of correlation samples;

at least one integration function that sums sets of one or more consecutive correlation samples to obtain a series of pulse sums, each pulse sum having an associated start time; and

a search function that integrates a plurality of sets of non-consecutive pulse sums, with the start times of each successive non-consecutive pulse sum in a given set being separated from a preceding pulse sum in the set by a pulse repeat value associated with the set, to obtain respective search values for the plurality of sets of non-consecutive pulse sums and selects an optimal search value as representing a pulse repeat interval for the signal of interest equal to the pulse repeat interval associated with the set of non-consecutive pulse sums represented by the optimal search value.

Claim 14. A computer readable medium as set forth in claim 13, wherein the search function accepts the pulse repeat value for the signal of interest if the selected search value meets a predetermined threshold value.

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Claim 15. A computer readable medium as set forth in claim 13, wherein each search value has an associated start delay, based upon the start time associated with a first of the set of non-consecutive pulse sums represented by the search value.

Claim 17. A computer readable medium as set forth in claim 15, wherein the search function repeatedly sums a plurality of sets of non-consecutive pulse sums for a series of associated start delays to produce a plurality of search values, each with an associated start delay and pulse repeat interval.

Claim 18. A computer readable medium as set forth in claim 17, wherein the search function compares each search value to a threshold value and accepts the associated values for the start delay and pulse repeat interval as representing characteristics of the signal of interest where the search value exceeds the threshold.

19. A computer readable medium as set forth in claim 13, wherein the set of input signal samples are derived from the input signal as it is received at a first antenna, and the set of complex conjugate samples is derived from the input signal as it is received at a second antenna.

20. A computer readable medium as set forth in claim 19, wherein the signal of interest is associated with a signal source, having an associated direction in relation to the first antenna, and the associated direction is determined from a phase value associated with the input signal.

EXAMINER'S STATEMENTS OF REASONS FOR ALLOWANCE

2. The following is an examiner's statement of reasons for allowance: Claims 1, 2, 4-11, 13-15, and 17-20 are allowable over prior art references because related references do not disclose detecting an optimal search value for a signal of interest by summing sets of one or more consecutive correlation samples to obtain pulse sums, integrating sets of non-consecutive pulse sums, wherein the start time of each pulse sum is separated from a preceding pulse sum by a pulse repeat value, wherein the optimal search value is represented as the pulse repeat value which separates the pulse sums associated with the set of non-consecutive pulse sums represented by the optimal search value.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

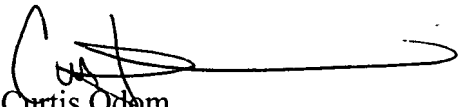
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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000..


Curtis Odom
February 28, 2007


JAY K. PATEL
SUPERVISORY PATENT EXAMINER